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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/560,518	04/28/2000	Richard C. Becker	Re frac-3	3374

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Donald N Halgren
35 Central Street
Manchester, MA 01944

EXAMINER

PADGETT, MARIANNE L

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 05/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

12

Office Action Summary

Application No.

09/560,578

Applicant(s)

Becker et al

Examiner

ML. P. Jett

Group Art Unit

1762

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☒ Responsive to communication(s) filed on 7/26/02 + 8/20/02
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-3, 5-11, 13-15 + 17-20 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1-3, 5-11, 13-15 + 17-20 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some* ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

Office Action Summary

1. Applicants' substitute specification is deficient, because it deleted the amendment concerning continuity on the new application transmittal (page 12 or page 1 of 5 of the added pages after page 11 of 11).

On page 8 of the 7/26/02 response, applicants allege that the amendment to page 5 "is not new matter since it was already in the application", however they fail to disclose where in the specification this information is to be found. No discussion concerning "boron at slightly greater than 95 atomic percent..." was found any where in the specification when skimmed by the examiner. Discussion on "boron-rich" was found in original claim 1 or 9, which related it to "the initial ratio of boron to a companion element is 20 or greater", and did not limit what else to the boron-rich feedstock may contain, and did not cover "all elements" only one. Similarly, the abstract discusses "Borides with a boron-to-metal ratio of 20 or more" that may be used as feedstock, but does not include all elements in this value, nor clearly relate this range to "boron-rich". Applicant provides no explanation of why these original parts of the specification should necessarily support the amendment, which while related, appears to be of different scope, unless some other original disclosure or prior art reference may be used to provide support for the difference in scope.

While the amendment to page 24, provides a definition for "EDAX" used on pages 22 and 24, no prior art reference was provided to show support for this amendment, thus until such support is shown, "energy dispersive analysis by X-ray" must be considered to add New Matter.

Until the above problems are corrected by amendment, and/or prior art and/or explanation, the substitute specification will not be entered.

2. At the bottom of page 7 of the 7/26/02 response, it is noted that applicant directs the claims to be renumbered. This is improper, as the claims are NEVER renumbered during

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prosecution, but only by the examiner when the case is allowed and a notice of allowance sent out. These instructions will not be followed.

3. The disclosure is objected to because of the following informalities: Applicants' specification appears to still contain an undefined abbreviation or acronym on page 12, "HVOF" which stands for some unknown process, probably for some type of deposition. Note showing support (prior art) for any amended meaning, not already disclosed in the original specification, is needed to avoid New Matter.

Appropriate correction is required.

4. Claims 2, 6 and 10-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 6, line 1 "said companion elements" (plural, emphasis added) lacks antecedent basis, as the limitation in the independent claim is for only a single element, not plural, and claim 5, from which 6 depends has been amended to be consistent with the independent claim. The initial limitation is singular, hence expanding the scope to include plural is improper, however since claim 6, and 5 as originally submitted claimed plural, one could amend claim 1 (ii) to read—one or more companion elements--, which with the claims then being self - consistent, may supply support/arguments as discussed above in section 1, for supporting part of the page 5 amendments to the specification.

Claim 11, dependent from claims 9 and 10, has analogous problems, since "said companion element" is inconsistent with the defining "at least one". A singular element cannot be more than one type.

Claims 2 and 10 remain uncertain (as described on page 3 of Paper No. 6) as to how the compound of boron relates to the companion element. As no particular relationship is

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necessitated the companion element may be unrelated to the claimed compound, or it could be part of the compound. The claims could be considered to be ambiguous with respect to the meaning due to the lack of defined relationship, or they could merely be considered to be broad, so as to encompass both possibilities (then its not a 112, 2nd problem), however the two possibilities provide different meaning for the ratio range of step (ii) of the independent claims, whether or not the element is amended to include plurals, thus balancing on the side of vague and indefinite.

Other 112 problems appear to have been appropriately corrected.

5. The terminal disclaimer, submitted 7/26/02 is acceptable, hence the judicial double patenting rejection is overcome.

6. The examiner notes that applicants appear to be reading more meaning into "substantially composed" than is warranted by the meaning of the language used. The relevant definition from Webster's for "substantial" is "considerable in quantity: significantly large", none of which requires any specific quantity, just that the amount of B must be significant or large, as composed to the total elemental composition. At best, one might define a range of 50% or more as being substantial, but even that is not really necessitated by applicants' claim language, so arguments that results are considerably greater than 50% B are not "substantial" are far from convincing.

7. The patent to Dowben et al (is no longer a 103(a) reference by it self, as the amendment to the deposition process Markush group of step (ii) removed the laser induced deposition from solution from the possible claimed selections.

8. Applicants' comments concerning Kawabe et al not coating appear to be correct as the passage on col. 4, lines 49-70, particularly line 65, was miss read as using the furnace for vaporizing, when vaporizing is being prevented. However, Kawabe et al teach a variety of

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products in Table 1, YB₆ as recognized by applicant, but also YB₆₆, YB₁₂, etc, and as noted above "substantially" does not exclude any of these products from reading on applicant's claimed general amount. Applicants' arguments that ignore the YB₆₆ are especially not convincing.

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over the JP 7-245409A to Mitsubishi Electric Corp, by Kataoka et al.

Claims 2, 5-11, 13-15 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kataoka et al.

In Kataoka et al, see the English abstract and in the Derwent translation, particularly see claim 1 and 10, the summary on page 4/43; paragraphs [0022], [0034] and [0042] that discuss use of YB₆₆ as an oxidation-resistant semiconductor material used as a coating, where [0042] is Ex. 5, and deposits YB₆₆ via a sputtering method onto a Si-substrate using a Y-B target. Example 1 and Fig. 1 provide teaching on the layer structure of the device formed.

Kataoka et al's disclosure of a Y-B target does not specify the ratio of Yttrium to Boron, however it would have been inherently impossible to produce a B to Y ratio of 66 to 1 on the substrate without an initial ratio sufficiently near to the product, thus in the claimed range. Alternately, it would have been obvious to one of ordinary skill in the art to supply a Y-B target with an elemental ratio sufficient to produce the taught deposits, where vaporization characteristics, under sputtering conditions would have been taken into account.

As well as not providing a target Y: B ratio, whether the Y-B target comprises a compound of boron and/or a solid solution is not specified, but as the target contains both Y and B and is solid one of ordinary skill would have expected it to be one or the other or a combination thereof, because sputtering targets are coherent structures, where unless the elements are specified to be supplied from separate targets, would have been expected to have been relatively evenly or homogenously distributed in the single target.

Kataoka et al do not give process parameters for their sputtering operation, but clearly expect them to be determinable via routine experimentation. As microstructure and compound formation is old and well known to have temperature dependent characteristics, one of ordinary skill would have been expected to control the substrate temperature, in order to achieve the taught YB₆₆ deposition. Sputtering deposition is a plasma process, that involves control of the voltage to the target and the substrate to cause plasma gas to sputter target material which is attracted to and deposited on the substrate, as is known to one of ordinary skill, thus control of substrate voltage would have been obvious to one of ordinary skill, given the taught use of sputter deposition of YB₆₆.

Kataoka et al do not discuss a carrier gas or composition and pressure of gases in the sputtering environment, however as the sputtering process requires use of a plasma/carrier gas, it would have been obvious to one of ordinary skill in the art to employ one that does not

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interfere with deposition of YB_{66} from the taught YB target, thus use of an inert gas such as Ar and/or a gas that would prevent formation of contaminants like carbonates or oxides), such as a reducing gas, would have been expected to be employed. Especially note, as illustrated by Kataoka et al's example 6, that if the atmosphere was expected to cause reaction, such as oxidation, the process of reactive sputtering would have been specified by the reference.

11. The references of Kamegaya et al (plasma spraying); Aida et al (prefers electron beam evaporation); and Spencer (heats substrate via Ti resistance wire= direct electrical heating or laser) are of interest for teaching metal boron disposition processes, which would suggest alternate possible disposition techniques one might employ with Kataoka et al, however Kamegaya et al and Aida et al use lower M to B ratios for disposition precursor than claimed. For Spencer, the initial ratio is not directly related, because the B vapor, such as $B_{10}H_{14}$, is supplied separately from the other metal, such as $NiCl_2$, but then form metal boron clusters. Those given formulas, i.e. $Ni(BH_4)_2$ or $Al(BH_4)_3$ have lower M:B ratios than claimed, but no cluster formulas are given for the Lanthanum series, which is taught for use in the process, so cannot be evaluated for B:M ratio of the precursor cluster. Note the claimed metal purity of up to 99.9%, means B maybe 100 to 0.1%, a very wide range.

12. Applicant's arguments filed 7/27/02 and discussed above have been fully considered but they are not persuasive.

Applicant's arguments are mute in view of a new grounds of rejection. As arguments may be made both for and against making this action final, due to amendments of applicants, the finality will be withheld.

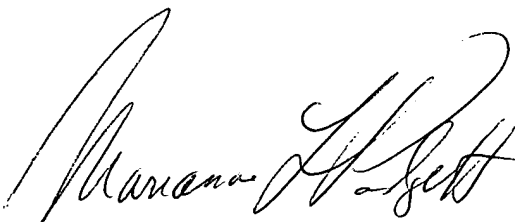
13. Any inquiry concerning this communication from the examiner should be directed to M. L. Padgett whose telephone number is (703) 308-2336. The examiner

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can generally be reached on Monday-Friday from about 8:30 a.m. to 4:30 p.m.; and fax phone numbers are (703) 872-9310 (regular); (703) 872-9311 (after final); and (703) 305-6078 (unofficial).

M.L. Padgett/dh 5/02/03

May 20, 2003



**MARIANNE PADGETT
PRIMARY EXAMINER**